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AUTHOR Anandam, Kamala
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ABSTRACT

In order to meet the challenge of institutionalizing technology, community college educators must first define their needs; second, delineate the physical, social, and cultural conditions that affect the environment; and third, examine the knowledge made available through the computer and its paraphernalia. Institutionalizing technology requires: (1) establishing institutional policies that address themes of funding; human infrastructure; rights and responsibilities of students, faculty, and staff; faculty and staff recruitment; and criteria for promotions, honors, and awards; (2) obtaining external funding; (3) undertaking a cost effectiveness study; (4) restructuring the human infrastructure; (5) using a 1:1:1:1/2 ratio in budgeting for hardware, software, personnel, and upgrading; (6) involving department heads in the integration of computing and curriculum; (7) promoting discipline-based training of faculty in computer applications; (8) promoting collaborative projects among faculty; (9) recognizing and rewarding employee contributions to the achievement of institutional goals; (10) providing pedagogical and research support to discipline coordinators and faculty; (11) shifting the role of faculty to become facilitators of learning; (12) encouraging faculty to become their own researchers as they integrate computer applications into their curriculum; (13) providing discipline-based support at the developmental level; and (14) informing administrators and staff of faculty's role in the integration of teaching and technology. (KP)

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Kamala Anandam

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The Challenge of Institutionalizing Technology

Kamala Anandam

Associate Dean, Educational Technologies

Miami-Dade Community College

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By way of providing a common ground for presenting my thoughts on the topic *The Challenge of Institutionalizing Technology*, I would like to define certain terms that bear some significance to my presentation.

Challenge - The quality of requiring full use of one's abilities, energy or resources.

Institutionalizing - To make or treat as an institution.

Institution - To establish custom, practice, or pattern of behavior important in the cultural life of a society. For my presentation, a college or campus is the society.

Technology - The knowledge that a civilization has available for adapting and using the environment to fit its needs.

Environment - The combination of external physical conditions that affect and influence the growth and development of organisms and the social and cultural conditions that affect the nature of an individual or community. Again, for my presentation, college or campus is the community.

Hardly anyone will dispute the definition of the term challenge. In an educational institution, we might modify it to read "requiring full use of collective (instead of one's) abilities, energy and (instead of or) resources." So, what should be the target of our full use of collective abilities, energy and resources?

Thus far, the target has been, by errors of omission or commission or both, the objects themselves instead of the knowledge they have provided us. In this case, the objects have been computers -- mainframes, minis and micros. This misplaced target is understandable since these objects and the tools to manipulate them are varied, complicated, complex, specialized, flexible, and ever-changing and the mastery of manipulating them has caught our fancy. More importantly, they gave rise to a group of individuals in the 60's and 70's who developed the expertise to manipulate them and provide needed (and sometimes not so needed) services to others. This arrangement created what has come to be known as the "mainframe culture" with a czar of computing overseeing the planning, operations and evaluation. In spite of an autocratic and mystical nature of the mainframe culture, it did succeed in streamlining and automating the administrative services and validating the hierarchical infrastructure that existed in most institutions. The advent of microcomputers opened the gates of computing power and made it accessible to individuals who were outside of the mainframe culture. With a slow but steady disappearance of that mystic reverence to computing power, institutions are finding that they can no longer maintain a hierarchical mode for their operations. That is the challenge.

Going back to the definitions for a moment, technology means the knowledge that a civilization has available for adapting and using its environment to fit its needs. And again, environment includes external physical conditions as well as social and cultural conditions. The former influences the growth and the latter influences the nature of an

individual or community. In order to meet our challenge, we must first define our needs, second, delineate the physical, social and cultural conditions which affect our environment and third, examine the knowledge made available to us by the computer with all its paraphernalia.

Basically, the primary need of an educational institution is to remain a viable institution in order to serve its students effectively and efficiently and a secondary need is to enhance the productivity of its employees and the quality of the working environment in order to achieve its primary need. In delineating the conditions that affect our environment, on the growth side, there are those external conditions such as population trends, funding, competition, and job market. Before we can delineate the social and cultural conditions, we need to understand the nature of the educational community, in our case, the community college. Who are we? What are we about? According to the US Department of Education, the 1992-93 statistics show that there were 5,485,512 students enrolled in 1,024 public 2-year colleges of whom 26.6% were minority students. We represent the Community College System, a uniquely American concept to provide access to higher education to all, the rich and the poor, the young and the old, the bold and the timid, and the prepared and the underprepared. What are we about is rather difficult to explain. By and large, we care about our community and our students; we work hard to give a second and third chance to our students; we don't hesitate to give our time to help the needy students; we play by the rules; we are innovative; we are loyal to our institutions; we are institutionally organized to take on large projects; we have very little turnovers; and, we

cherish professional and staff development. The social conditions that influence what we are about are leadership, organization (including "mainframe czar" and "microcomputer guru" cultures), policies and procedures, governance, communication, support, community orientation, incentives, rewards, and last but not least, professional organizations. The cultural conditions that influence what we are about are the traditions, customs, rituals, and mores that govern our behaviors and expectations. In a way, the conditions (whatever they are) are institutionally accepted in the unwritten laws (I might even go as far as labeling them "sacred cows") and life goes on. You may define your needs and the physical, social and cultural conditions that affect your environment differently. What is important for my presentation is that you follow through the steps I am explaining in the process to meet the challenge of institutionalizing technology.

Defining our needs and identifying the conditions that affect our environment are the steps I've mentioned thus far in this process. Next, we need to examine the knowledge made available to us through the computer and all its related inventions and innovations. Some of the major conclusions are as follows:

1. Employees have greater access to computer power and, consequently, have greater individual power which, in turn, poses a challenge to the institutional organization and methods of administration.

2. Electronic communication promotes timely dissemination of information and processing of administrative requests as well as enhance teaching and learning through faculty-student, faculty-faculty, and student-student on-line dialogues. This communication has no institutional boundaries.

3. The focus is shifting slowly but steadily, from teaching to learning which, in turn, poses a challenge to institutional traditions such as contact hours, class size,

beginning and end of terms to complete a course, and methods of delivering of instruction.

4. Increased access to computer power at home, in the workplace and, sometimes, at shopping malls and entertainment locations, is rendering time and distance irrelevant to teaching and learning. Consequently, investment in buildings and traditional methods of delivering instruction come into question.

5. Productivity has increased in administrative operations, but ironically, almost everyone feels that there is not sufficient time in the day to do everything that needs to be done. (How often do we hear the expression "it should have been done yesterday"!)

6. Investment in computer resources for instruction had mainly come from external sources - state and federal agencies, foundations, industries, local property taxes and lottery. In most instances, this investment had remained an add-on cost and has not been incorporated into our operating budgets. With all sources of funding shrinking in size, educational institutions are challenged as never before to contain the cost of computers within their operating budget. This is not easy given the labor intensive tradition in education.

7. The down sizing we have been witnessing in industries and governments will make its way to educational institutions sooner or later. Will the colleges prepare themselves to be proactive rather than reactive to this eventuality?

8. The impact of computers on student performance is not at all conclusive. While there are pockets of excellence to maintain our faith, the outcomes in those cases point to a superior teacher (not necessarily a popular one, a well known figure, or an award winner), well versed in content and pedagogy and willing to use computer assistance.

9. Students have been observed to spend more time on a task, work at their own pace, and complete the requirements at different points in time.

My list of conclusions is not intended to be exhaustive or noncontroversal. In the discussion period at the end of this forum, I would love to hear your conclusions and disagreements with mine.

Having defined our needs, delineated the physical, social and cultural conditions which affect our environment, and examined the knowledge we have available for adapting and using our environment to fit our needs, how shall we meet the challenge of institutionalizing technology? I would like to share my thought with you under four aspects of an institutional infrastructure. My thoughts have evolved not only through Project SYNERGY experience in recent years, but also from my observations over the last 20 years about the progress (sometimes lack of it) in educators' attempts to integrate teaching, learning, and computing. More importantly, my observations are still in the making.

Aspect One: Institutional Policies

We need to establish institutional policies that address the following themes:

1. Investment in computing will be justifiable on the basis of achieving institutional goals, such that one can always measure if the goals are achieved and, thus, be more accountable.

2. Human infrastructure which will facilitate planning, implementation, evaluation and communication. The present hierarchical structure is not appropriate. We need more grassroots involvement and timely communication, both of which call for a different kind of organization.

3. Rights and responsibilities of citizens of the educational community (student, faculty, staff, and administrators) in the use of the technical infrastructure. A big issue in this regard is to undo the irrelevant aspects of the mainframe culture. Equally important is the need to address the issue of territorial ownership of computing power. We should promote territorial openness.

4. Recruitment of new faculty, administrators, and staff -- whom would we like to hire? Should their roles be any different from those already in place? Will there be

a window of opportunity to modify our traditional practices to be in tune with the knowledge made available by computers.

5. Criteria for promotion, honors, and awards. This will, no doubt, tie to item #1 above, and the technology aspects will be incorporated into the overall criteria an institution uses for promoting and honoring its employees.

Aspect Two: Planning and Budgeting

1. Creating a position or two to secure external funding on an on-going basis to meet institutional priorities.

2. Undertaking a cost effectiveness study to minimize or avoid the "add-on" cost of computing power. This study should ensure grassroots involvement and place all cards on the table - institutional organization, budget allocation, communication, faculty load, class size, instructional delivery methods, productivity, and whatever else.

3. Restructuring the human and technical infrastructure based on the cost effectiveness study. I am sure some activities will become highly centralized and others will become controlled at the local levels.

4. Using 1:1:1:½ ratio in budgeting for hardware, software, personnel and upgrading. The cost for personnel includes faculty development, educational research and technical support. Please see Appendix A for a job description of Software Implementation Director and Software Implementation Assistant.

Aspect Three: Operations

1. Departmental leadership is critical for integrating computing and curriculum. Instead of being a mid-level manager, the head of the department should be an academic leader and promote the integration to increase the efficiency and effectiveness of the department. Efficiency means doing things right with a minimum of waste, expense and effort. Effectiveness means doing the right things, in this case, serving our students on an individual basis. The chairperson has to be respected for his/her knowledge of the discipline and his/her use of computing power and the knowledge made available by it.

2. Promoting discipline-based training of faculty in the uses of computer applications. In the past years, we have offered numerous workshops for faculty to gain computer literacy and skills in using productivity tools such as word-processing, grade books, and spreadsheets. Time has come to stop offering those kind of workshops and spend our effort and money to identify a faculty member in each

discipline to train other faculty to examine and use various instructional software in that discipline. These individuals (discipline coordinators)will become a node in the restructuring of the human infrastructure called for by the challenge.

3. Promoting collaborative projects among faculty within a department, but more importantly across departments in order to enhance the relevance of what we teach our students. This will also encourage the territorial openness regarding technology referred to earlier.

4. Recognizing and rewarding employee contribution to achieving institutional goals. Let us not forget that some significant contributions are being made and will be made in the future in the quiet corners of our institutions by individuals who don't care much to be in the limelight.

5. Providing pedagogical and research support to discipline coordinators and faculty. Please see Appendix A for a job description of Software Implementation Director and Software Implementation Assistant. The former will function at the campus level assisting several discipline coordinators and the latter will assist in the computer labs.

Aspect Four: Employee Development

1. In integrating computer applications, faculty are expected to become facilitators of learning. This is an enormous role shift form being transmitters of information. One has to become quite knowledgeable about learning in order to facilitate learning. In the facilitator role, one has to be silent more often than not, observe student activity and know when to intervene, and so on. Offering graduate courses in cognitive psychology combined with practical applications will be helpful here.

2. Faculty need to be encouraged to become their own researchers as they begin to integrate computer applications into their curriculum. They need to hypothesize what benefits will accrue to them and their students. Then, orchestrate what they will do and which kinds of computer applications they will use in order to obtain the anticipated results and evaluate the outcomes. This orchestration will require several iterations before one can see some tangible result. That is why I recommend that faculty view this process as formative evaluation and what is critical to this process is their internal frames of reference. Furthermore, according to my colleague, Victor Nwankwo, research must be viewed as "an instrument of change and not a litmus test of good teaching."

3. Discipline-based support at the departmental level is very useful in encouraging faculty to become facilitators of learning because the necessary camaraderie is in place to help them through the changes.

4. Administrators and staff need to know about the faculty's role in integrating teaching and technology and learn about new and different ways to support them.

By way of summarizing my thoughts, let me say that as we begin to examine our respective institutional infrastructure, it behooves us to keep the following issues in the forefront. The integration of technology with teaching and learning will undoubtedly raise questions about:

1. Curriculum, competencies and assessment.
2. The practice of treating all courses equally in terms of staffing and time.
3. The appropriateness of a group mode for instruction as opposed to individualization.
4. The various combinations of human and computer resources that will yield the best results for different students.
5. The role of faculty in students' learning and how to measure their contribution to that learning.

Addressing these issues adequately will depend, to a large extent, on grassroots involvement of faculty, tutors, staff, counselors and administrators, a leader who is a good listener and synthesizer of various points of view, taking the time to let the process of human interaction and collective analysis work, and viewing the challenge as a dynamic process rather than a static end-product. In the final analysis, meeting the challenge will result in a transformation of our institutions. Just as I began with definitions of terms, let me conclude with a definition. To transform means: to change the nature, function, or condition of; to change markedly the form or appearance. In layperson's terms: "It won't be business as usual."

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JOB DESCRIPTION

Software Implementation Director

The Software Implementation Director is required to provide technical and educational support for faculty on all campuses to design and implement effective strategies for integrating teaching, learning, and technology and to evaluate the outcomes.

Regarding the technical aspect, the Software Implementation Director is expected to insure that the Local Area Network (LAN) housed in each of the SYNERGY Centers is providing a conductive teaching and learning environment to faculty and students to concentrate on their task. This expectation requires selecting the appropriate hardware and establishing the local area network, taking into consideration the needs of disabled students; in consultation with faculty, acquiring the appropriate software and installing it on the LAN; implementing the necessary customization of hardware configuration and software to meet the needs of the campuses; assisting the campuses to determine their future needs and helping them to meet those needs; providing technical training for SYNERGY Center managers and tutors; minimizing network problems, technical impediments, and interruptions in the SYNERGY Centers.

Regarding the educational aspect, the Software Implementation Director is expected to offer faculty-development activities to help faculty understand the intricacies of the instructional software, determine the appropriate ways to integrate it into the curriculum, and design research studies to evaluate the outcomes. These activities include organized workshops as well as an on-going training program with individual or small groups of faculty across a semester.

The Software Implementation Director is also expected to keep up with research literature on the impact of technology and teaching/learning, design ways to collect data for faculty research, conduct an analysis of the data, provide feedback to faculty in a way to help them improve their uses of technology, and prepare research reports for dissemination.

In addition, the Software Implementation Director is expected to communicate with software publishers and negotiate with them to install their software on a pilot basis so that faculty could evaluate its quality for a semester or two with their students prior to making decisions to purchase the software.

Requirements

A strong background in using technology for instruction, conducting faculty-development activities, installing and maintaining LANs, resolving compatibility issues with operating systems, and using electronic communication. A master's degree and three or four years of experience with a combination of the technical and educational aspects of this job as described.

Preferred

Familiarity with college-prep programs in general and those at M-DCC in particular.

JOB DESCRIPTION

Software Implementation Assistant I

This individual will assist the collegewide Software Implementation Director in carrying out the responsibilities associated with a SYNERGY Center. Illustrative duties include (but are not limited to) ordering, installing, and maintaining hardware/software for the SYNERGY Centers; becoming sufficiently familiar with PSI and the installed instructional software to assist faculty in exploring the software; assisting in preparing materials for student and faculty orientation in the use of SYNERGY Center; managing the day-to-day operations of the SYNERGY Center; assisting students and faculty when they use the SYNERGY Center; and collecting, compiling, and preparing data for analysis relative to the evaluation studies conducted at the SYNERGY Centers.

Requirements

Bachelor's degree in a computer-related curriculum and two years of experience with computer labs or an equivalent combination of education and experience; and skills in interpersonal relations, communication, and teamwork.

Preferred

Experience in Netware and Windows and in working with underprepared college students.